REMARKS ON CRYPTOPHLEBIA WALSINGHAM AND RELATED GENERA (LEPIDOPTERA, TORTRICIDAE, OLETHREUTINAE)

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The classification of the subfamily Olethreutinae of the family Tortricidae is in great need of a fundamental generic revision. The present state of this classification is rather chaotic. Besides, there exist a great number of compound species the true taxonomic position of which hitherto remains obscure. On the other hand this study is attractive by the excellent use that can be made of the genital characters of the two sexes for the discrimination of the species, and often also, of the genera. The species are numerous and many of them are important enemies of cultivated crops.

When trying to identify an extensive material, accumulated after years of collecting in the Tropics, one is immediately faced with the necessity of such a generic revision. The field is so great that it is of less importance where to begin; but it is imperative to consult as many related forms from various faunas as possible. Often then only important relationships become apparent which otherwise cannot be detected.

The following may serve as an example. When trying to identify material from New Guinea belonging to the characteristic species group "*illepida*" of the compound genus "*Argyroploce*" (sensu Walsingham and Meyrick), I incidentally stumbled over the obvious relationship of the above-mentioned group of tropical species with the Nearctic *Pseudogalleria* Ragonot (DIAKONOFF, 1953, p. 156—157). Somewhat earlier a thorough analysis of a series of old species by BRADLEY (1952) revealed their compound character and provided a new synonymy.

A taxonomist can never have enough material for comparison at hand. When working on the New Guinea species at the Buitenzorg Museum, Java, the present author actually needed Nearctic material for comparison ! When later the happy opportunity presented itself for paying visits to several museums in the United States, I found the following link of this taxonomic chain in the collection of Cornell University, Ithaca, New York. The common North American species, *Ecdytolopha insiticiana* Zeller, was at once recognized as a close relative of some tropical Asiatic species of *Cryptophlebia.*

The true character of these modified species which are common in circumtropical countries, strangely enough, was recognized for the first time in the Nearctic stragglers of the group, i.e., its northernmost representatives. The aberrant character of these stragglers did not fit in with that of the Nearctic fauna This is why the eminent reviser of the North American Olethreutinae, HEINRICH (1923, 1926) placed *Pseudogalleria* Ragonot at the very beginning of the tribe Eucosmini (his subfamily Eucosminae), whilst *Gymnandrosoma* Dyar and *Ecdy-*

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tolopha Zeller were put at the very base of another tribe, Laspeyresiini (his Laspeyresiinae)! If he could have compared sufficient material from tropical Asia and Africa, he would have realized that the latter two genera are but synonyms, as they are separated by secondary sexual characters only (abnormal shape of the male hind wing and haired legs); these characters had a parallel development in the related genus *Cryptophlebia,* and are there either present or absent. Then also HEINRICH would have realised that *Ecdytolopha* is a close relative of *Pseudogalleria,* possibly being the "clay" from which the latter genus was shaped

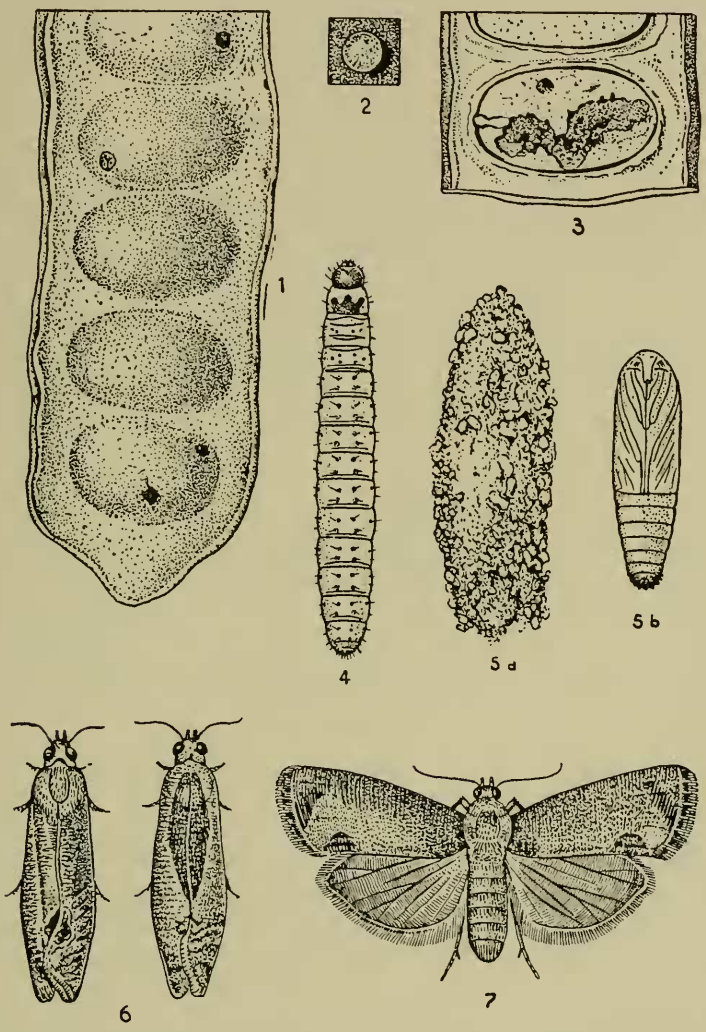
When I first noticed the relation between *Pseudogalleria* and *Cryptophlebia* (1953), judging from the extreme similarity of the male genitalia in several New Guinean species of the latter genus and of those of *Pseudogalleria inimicella* Zeller (figured by HEINRICH), I was compelled to regard these two genera as congeneric; material of *inimicella* was not available to me at that time (in Java). However, having been able to study this North American species closely, I now am satisfied that the genus *Pseudogalleria*, although structurally extremely close to *Cryptophlebia*, should better be treated as distinct, being an isolated off-shoot of the tropical *Cryptophlebia* stock, and a far northern pioneer of the group. In its isolation *Pseudogalleria* underwent greater modification and acquired a characteristic facies (e.g., long., narrow wings with straight veins, a remarkable concave termen, etc.); this is so distinctive that a fusion of *Pseudogalleria* and *Cryptophlebia* would not be in accordance with a natural classification; neither would be a subgeneric distinction.

The relationship of the three genera is very close. In *Ecdytolopha insiticiana* vein 5 of the hind wing makes the impression of being parallel which is a delusion. Close inspection reveals that this vein is approximated to vein 4 towards the base (fig. 8). This situation is more evident in *"Gymnandrosoma" punctidiscanum* Dyar (fig. 9). Herewith breaks down the fundamental difference between *Ecdytolopha* on the one side, and *Pseudogalleria* and *Cryptophlebia* on the other, the last two genera possessing a vein 5 in the hind wing distinctly approximated to 4. The superficial resemblance of *Ecdytolopha* and *Cryptophlebia* is striking: the robust build, the often triangular wings, and the fundamental markings of the fore wing are the same. *E. punctidiscana* and many species of *Cryptophlebia* possess modified hair-clothing of the male abdomen which became extremely specialised in *punctidiscana.* Another remarkable character which *E. punctidiscana* has in common with many *Cryptophlebia* species, is the extremely dense clothing of the male hind tibiae (figs. 21—22) which sometimes is differentiated into separate brushes and pencils of differently coloured and shaped hair-scales (an important specific character). Finally the modifications of the male hind wing form one more common feature: the disc and cilia of the dorsal area often are more or less modified, the margin forming a rounded lobe with androconia, folded over the under side of the wing and concealing a cavity with (presumably) scent hairs; sometimes this cavity is reduced to a narrow fold, flanked by long cilia: the neuration of the hind wing is often slightly distorted consequently; sometimes the marginal cilia are thickened and differently coloured.

The difference between *Ecdytolopha* and *Cryptophlebia* is that the male genitalia are more differentiated in the latter genus, viz., with blown up valvae, armed with heavy spines.

As to the relationship of *Pseudogalleria* and *Cryptophlebia,* this is especially clear in the build of the male genitalia, as already stipulated above; modifications of the eighth abdominal segment, reduction of the tegumen, and strong development of the valvae (sclerotization, armature) are extremely similar. The differences are the characteristic facies of *Pseudogalleria,* probably owing to some far advanced specialisation (mimicry ?), the different distribution, and minor structural differences, as, e.g., normally haired hind tibiae in the male.

In my opinion the group formed by the three genera in question is a specialized



Figs. 1—7. Biology and stages of development of *Cryptophlebia ombrodelta* (Low.). 1. Pod of *Pithecolobium lobatum* with boring holes of the larva. 2. Egg. 3. Infested seed. 4. Larva. 5a. Cocoon. 5b. Pupa. 6. Adults, left, ♀ ; right, ♂. 7. The same, ♀. (After P. van der Goot, 1941).

off-shoot of *Dichrorampha*-like ancestors, and belongs to the tribe Laspeyresiini. The group is characterized by a strong reduction of the tegumen, contrary to the development of the ventral portion of the genital apparatus, viz., the valvae, and the vinculum with the adjacent sclerites: these parts, although of a simple build, are extremely robust and usually strongly sclerotized. The reduced ninth abdominal tergite (tegumen) apparently does not offer sufficient support or protection to the end of the abdomen, and this results in a characteristic sclerotization of the foregoing, eighth, sclerite, especially of its tergite. A tendency towards such modifications is characteristic for the entire tribe Laspeyresiini; sclerotizations of the eighth abdominal tergite may already be traced in the genus *Dichrorampha* and allies. The sclerites concerned, often darkly couloured, are of a specifically different shape, and add to the importance of the genitalia for the discrimination of the species.

After a short survey of the Nearctic genera *Ecdytolopha* and *Pseudogalleria*, a review of the species of *Cryptophlebia* from Indonesia is presented in this paper. The rather extensive material at my disposal proved to belong chiefly to *Cryptophlebia ombrodelta* Lower. Two new subgenera and two new species are described and their genitalia described and figured, along with those of two other, already known species. The types are preserved in the Leiden Museum. The above cited revision of certain species of *Cryptophlebia* by BRADLEY (1952) has been of much use to the compilation of the present paper. Notes and descriptions of some African species, and of those from the island of Sumba will be published elsewhere.

Ecdytolopha Zeller 1875 (figs. 8—9, 21)

Ecdytolopha Zeller 1875, Verh. zool.-bot. Ges. Wien, vol. 25, p. 266. Type of the genus: *Ecdytolopha insiticiana* Zeller. — Forbes, 1923, Lepid. New York, vol. 1, p. 397, fig. 250, 277. — Heinrich, 1926, U. S. Nat. Mus. Bull. 132, p. 73, fig. 10, 115.

Gymnandrosoma Dyar, 1904, Proc. Ent. Soc. Washington, vol. 6, p. 60. Type of the genus: *Gymnandrosoma punctidiscanum* Dyar. — Forbes, 1923, Lepid. New York, vol. 1, p. 397, fig. 251. — Heinrich, 1926, U. S. Nat. Mus. Bull. 132, p. 71, fig. 1, 3, 5, 38, 121. (Syn. nov.).

Head (fig. 8) rather roughly scaled, a short, dense, felt-like tuft on forehead. Ocellus posterior, almost inferior. Proboscis rahter short. Antenna slightly thickened, round (in cross section), normally tapering, simple. Palpus moderate, ascending and appressed to head, median segment elongate-truncate, little dilated, terminal segment small, pending, appressed and almost concealed in scales of median segment. Thorax with a strong posterior crest of appressed broad scales smooth and hump-like. Abdomen normal. Posterior tibia in male with rather long bristly hair-scales above and beneath.

Fore wing (fig. 8) with slightly raised rounded groups of scales. 12 veins, all separate, 2 from before $^2/_3$, 3 and 4 close together from angle, 10 remote from 9 upper parting vein in male from shortly beyond base of 10, to base of 7, in female, from a little before base of 9 to base of 7. Hind wing (fig. 8) in male on upper side of base of dorsum with a moderate flattened pencil of stiff

ochreous hair-scales, originating from a shallow impression along base of vein 1a, transversely projecting; vein 2 from $^2/_3$, 3 and 4 connate, 5 remote, distinctly curved downward towards base.

Male genitalia. Tegumen high, submembraneous, somewhat blown up, ventrally forming a median conical hairy lobe, protruding upwards. Uncus and socii absent. Gnathos distinctly developed and sclerotized, being a rather narrow transverse band, with a large blown up median body, conical, slightly compressed dorso-ventrally and pending. Transtilla, a moderate transverse band with a vertical median fold (very similar to the transtilla in several *Cryptophlebia* species). Valva long and strong, but not so characteristically modified as in *Pseudogalleria* and *Cryptophlebia*, i.e., not so strongly sclerotized and blown up, without the modified spines and with less heavy hinges to the juxta, but rather evenly and densely bristled along the ventral side of the cucullus; juxta extremely strong and darkly sclerotized, exactly as in *Pseudogalleria*, also the caulis is long and strong, as in that genus. Aedoeagus curved, with a dilated base; cornuti, a sheaf of rather slender sinuate spines.

The female genitalia approach those of *Pseudogalleria* and *Cryptophlebia* very closely. Lamella antevaginalis, a rather large typically shaped sclerite, often with an emargination in its caudal edge. Ductus bursae rather short. Bursa copulatrix partially aciculate.

In *Ecdytolopha punctidiscana* (Dyar) there are the following structural differences. Palpus (fig. 9) somewhat more slender, terminal segment subporrect, less concealed. Fore wing (fig. 9) with the accessory cell in male very small, upper parting vein running from a little before base of 9 to halfway between 7 and 8; in female the accessory cell absent. Vein 2 from more towards middle of the lower edge of cell.

Hind wing (fig. 9) with the neuration identical; in male, a long and dense fringe of hair-scales along vein 1a, with a whorl of dense and broad scales at base of this vein; dorsum beyond this vein extended so as to form a large oval lobe, smoothly scaled and folded under the wing, thus forming a deep open pocket, sparely scaled inside.

Abdomen in male with tergum remarkably modified. First tergite scaled only in middle, sides and caudal edge membraneous and naked; second tergite entirely naked, narrowly triangular with a caudad projection in middle, caudal edge on both sides of this forming a broad membrane; from under this membrane two subdorsal brush-like pale yellow pencils with flattened bases and dilated tops, directed caudad; third to fifth tergites smooth, clothed with very short scales; other tergites and venter normal.

Posterior tibiae (fig. 21) above with a long pencil of hairs from base, a fringe of similar but shorter hairs along posterior third of tibia above, and between basal and apical tufts a thick tuft of dark hairs with its basal half clothed with smooth and broad, shining scales.

The male genitalia of *punctidiscana* are nicely figured by Heinrich (1926, fig. 38); they do not differ from those of *insiticiana,* except for a few minor points of no generic importance (e.g., the absence of the median hairy lobe of the tegumen, and the shape and the size of certain other parts).

These peculiarities of *punctidiscana*, even the modification of the tergum of

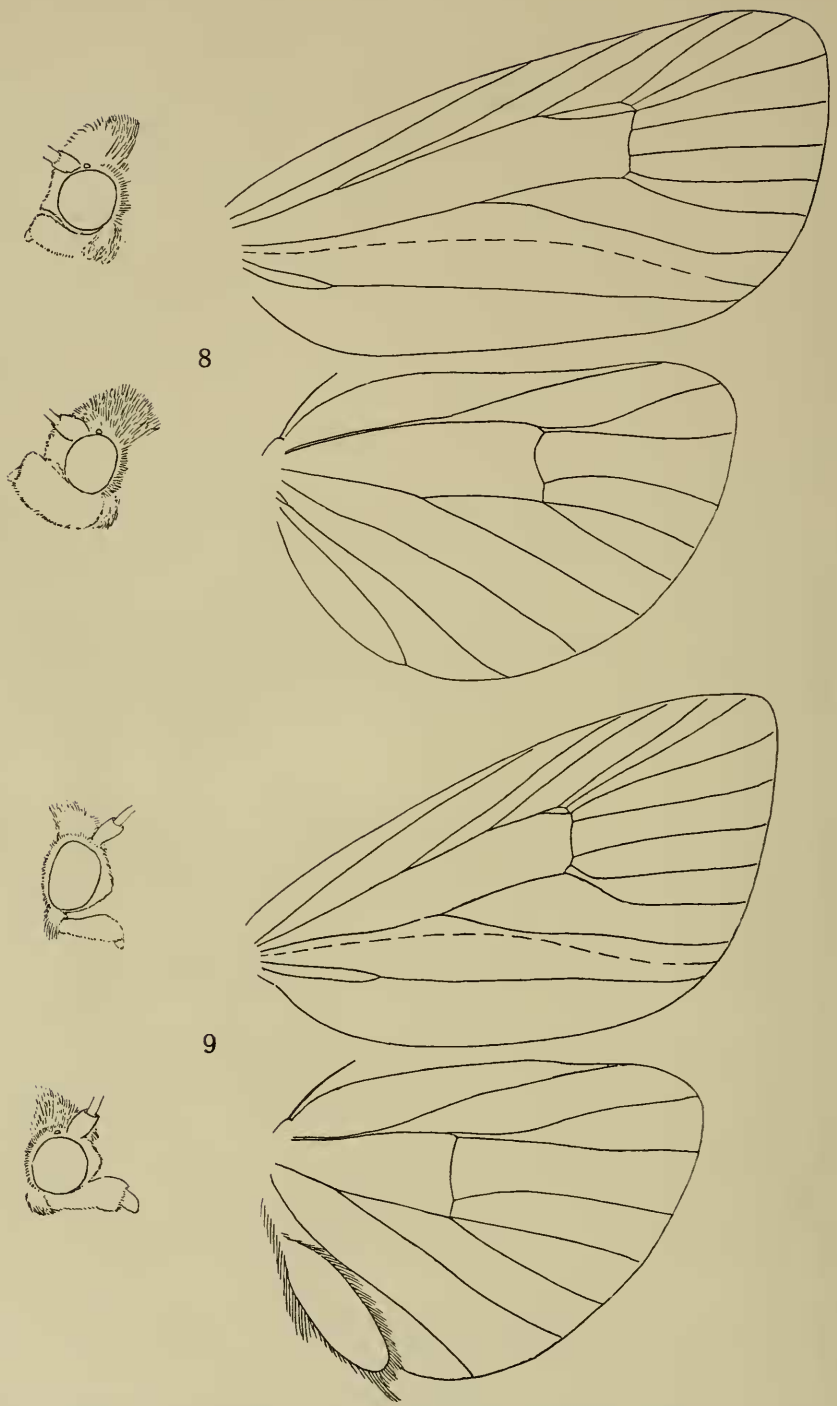


Fig. 8. *Ecdytolopha insiticiana* Zeller, head, male above, female below, and wing neuration, male. Fig. 9. *E. punctidiscana* (Dyar), head, male above, female below, and wing neuration, male.

the male abdomen, are simply secondary sexual characters. They are of specific value only. The modifications of the scaling of the hind tibia and of the dorsal area of the hind wing in the males are parallel to similar modifications in the males of diverse tropical species of *Cryptophlebia*, in these species the above mentioned modifications may be found in all possible variations, from being entirely absent to highly developed; there also they have purely specific value.

The general aspect of the male genitalia of *Ecdytolopha* apparently is exactly intermediate between that of the usual Laspeyresiine type, as, e.g., in *Carpocapsa*, and that of the *Pseudogalleria* type. The principal differences between *Ecdytolopha* and *Pseudogalleria* are the specialised, strongly sclerotized and blown up valvae, and the sclerotizations of the eighth abdominal segment, already mentioned above.

Material studied. *Ecdytolopha insiticiana* Zeller. Ithaca, New York, 13 August, 1956 (Cornell University). Sardinia, New York, 17 July, 1936 (L. R. Rupert). Wrangle Brook Ridge, Lakehurst, New Jersey, 24, 26 June, 1954 (J. G. Franclemont). 2 ♂, 2 ♀. *Ecdytolopha punctidiscana* (Dyar). Wrangle Brook Ridge, Lakehurst, New Jersey, 24 June, 1954 (J. G. Franclemont). Six-Mile, Ithaca, New York, 16. June, 1939. 1 ♂, 1 ♀.

Pseudogalleria Ragonot 1885 (fig. 10)

Pseudogalleria Ragonot 1885, Ann. Soc. Ent. Fr., ser. 6, vol. 4, Bull., p. L—LI (type of the genus: *Galleria inimicella* Zeller, Texas). — Heinrich, 1923, U. S. Nat. Mus. Bull. 123, p. 12, fig. 39, 40, 413. — Forbes, 1923, Lep. New York, vol. 1, p. 384, 447. — Fletcher, 1929, Mem. Agr. Ind., Ent., vol. 11, p. 189. — Diakonoff, 1953, Verh. Kon. Ned. Akad. Wet., Nat., ser. 2, vol. 49, no. 3, p. 156, fig. 369 (syn. *Cryptophlebia* Wals.).

Head (fig. 10) with a roughish vertex, face with long, dense, appressed scales. Ocellus posterior, close to base of scape. Antenna normal. Proboscis weak. Palpus moderate, subascending, appressed to face, rather smooth laterally, median segment elongate, straight, slightly roughish along lower and apical edges, terminal segment small, pending, in male almost entirely concealed in scales of median, in female a trifle more exposed. Thorax with a slight posterior crest, with dense, long, smoothly appressed scales, especially long on tegulae. Posterior tibiae in male normally scaled.

Fore wing (fig. 10) smooth, distinctly narrower than in *Ecdytolopha*, termen concave. 12 veins, all separate. 2 from beyond middle, 3, 4, and 5 almost equidistant, 4 a trifle nearer to 3, 9 from about $^1/_3$ distance between 8 and 10, 11 from almost $^1/_3$ of cell; upper parting vein in male from beyond base of 10 to base of 7, accessory cell extremely narrow in male, in female slightly wider, and with the anterior extremity shifted distad. Hind wing (fig. 10) in male normal; vein 2 from well beyond middle, 3 and 4 connate from angle, 5 curved downward and approximated at base, 6 and 7 closely approximated along basal $^1/_3$.

Male genitalia. Tegumen smooth, shaped like a broad simple band. Ventrad of this is present a large conical body which in my opinion is nothing else but a moderately sclerotized tuba analis, and not a gnathos, as Heinrich thought; the appearance of this part as being two contiguous processes of the tegumen (as figured by Heinrich) is deceiving; actually this is a short, wide tube, subconical, and slightly depressed dorso-ventrally. Vinculum very robust, but small. Valva strongly sclerotized, spoon-shaped, with spines on the inner surface; the basal portion of sacculus forming the articulation with vinculum, very strong. Caulis

long. Aedoeagus long, slender, curved. Cornuti, a series of slender flattened bristles. Eighth abdominal segment modified, tergite with a narrow marginal sclerite ("mensis dorsalis"), sternite with a suboval transverse sclerite.

Female genitalia. Sterigma little sclerotized, but of the same build as in *Cryptophlebia*: lamella antevaginalis with a deep emargination. Ductus bursae simple. Bursa copulatrix aciculate, with two somewhat inequal thorn-shaped signa.

The genus is an off-shoot of *Ecdytolopha*-like ancestors, showing characteristic modifications, but it is also closely allied to *Cryptophlebia*.

From *Ecdytolopha* it differs superficially only in facies: long, less curved veins, concave termen, concealed terminal joint of the palpi, and by minor structures, as, e.g., the vein 5 in the hind wing being more curved and approximated to 4 at base, and the hardly developed posterior crest of the thorax in the present genus. The male genitalia, however, are considerably more specialized along the same lines as in *Cryptophlebia,* but less far than in that genus.

The characters of *Pseudogalleria* suggest specialization, perhaps, along mimetic lines, the adults having a characteristic colouring and markings widely differing from the pattern usual in the group; ZELLER's name suggests resemblance of the Pyralid *Galleria melonella* L., a world wide distributed parasite of bee-hives which resemblance indeed is striking.

Material studied. Kittery Point, Maine, U.S.A., 31.V.1883, 1 ♂, gen. 2243; 16.V.1884, 1 ♀, gen. no. 2244 (R. THAXTER). I owe this material to the kindness or Dr. J. F. GATES CLARKE of the United States National Museum, Washington.

Cryptophlebia Walsingham 1899 (fig. 11—15, 20, 22)

Cryptophlebia Walsingham 1899, Ind. Mus. Notes, vol. 4, p. 105 (type of the genus: *C. carpophaga* Wals. = *Arothrophora* (?) *ombrodelta* Low., South Asia, Australia). — Fletcher, 1929, Mem. Agr. Ind., Ent., vol. 11, p. 61 (syn. of *Argyroploce* Hübn.). — Bradley, 1953, Bull. Ent. Res., vol. 43, p. 682 (syn. *Pogonozada* Hamps.). — Diakonoff, 1953, Verh. Kon. Ned. Akad. Wet., Nat., ser. 2, vol. 49, no. 3, p. 156 (syn. of *Pseudogalleria* Rag.).

Pogonozada Hampson 1905, Ann. Mag. Nat. Hist., ser. 7, vol. 16, p. 586 (type of the genus: *P. distorta* Hamps.). — Bradley, 1953, Bull. Ent. Res., vol. 43, p. 682 (syn. of *Cryptophlebia* Wals.). — Diakonoff, 1953, Verh. Kon. Ned. Akad. Wet., Nat., ser. 2, vol. 49, no. 3, p. 156 (syn. of *Pseudogalleria* Rag.).

Pseudogalleria, partim, Diakonoff, 1953 non Ragonot 1885, Verh. Kon. Ned. Akad. Wet., Nat., ser. 2, vol. 49, no. 3, p. 156—157, fig. 369.

Head (fig. 11) with dense, raised, but not rough hairs. Antenna normal. Ocellus posterior, more or less approximated, sometimes contiguous with the base of scape. Proboscis weak. Palpus porrect or subascending, not appressed to face, moderate, longer in female, median segment with lower edge, apical half of upper edge, and apex roughish; slightly sinuate, slender at base, abruptly dilated towards apex, more so in female; terminal segment short in male, moderate in female, smooth, subtruncate, pending and exposed. Thorax with a moderate posterior crest, notum sometimes thickened with raised scales. Posterior tibia and basal segment of posterior tarsus in male (fig. 22) with extremely dense and thick brushes of differently coloured scales above and beneath, seldom (in smaller species) normal. Abdomen in male usually with a long mane of hairs on notum, anal tuft large.

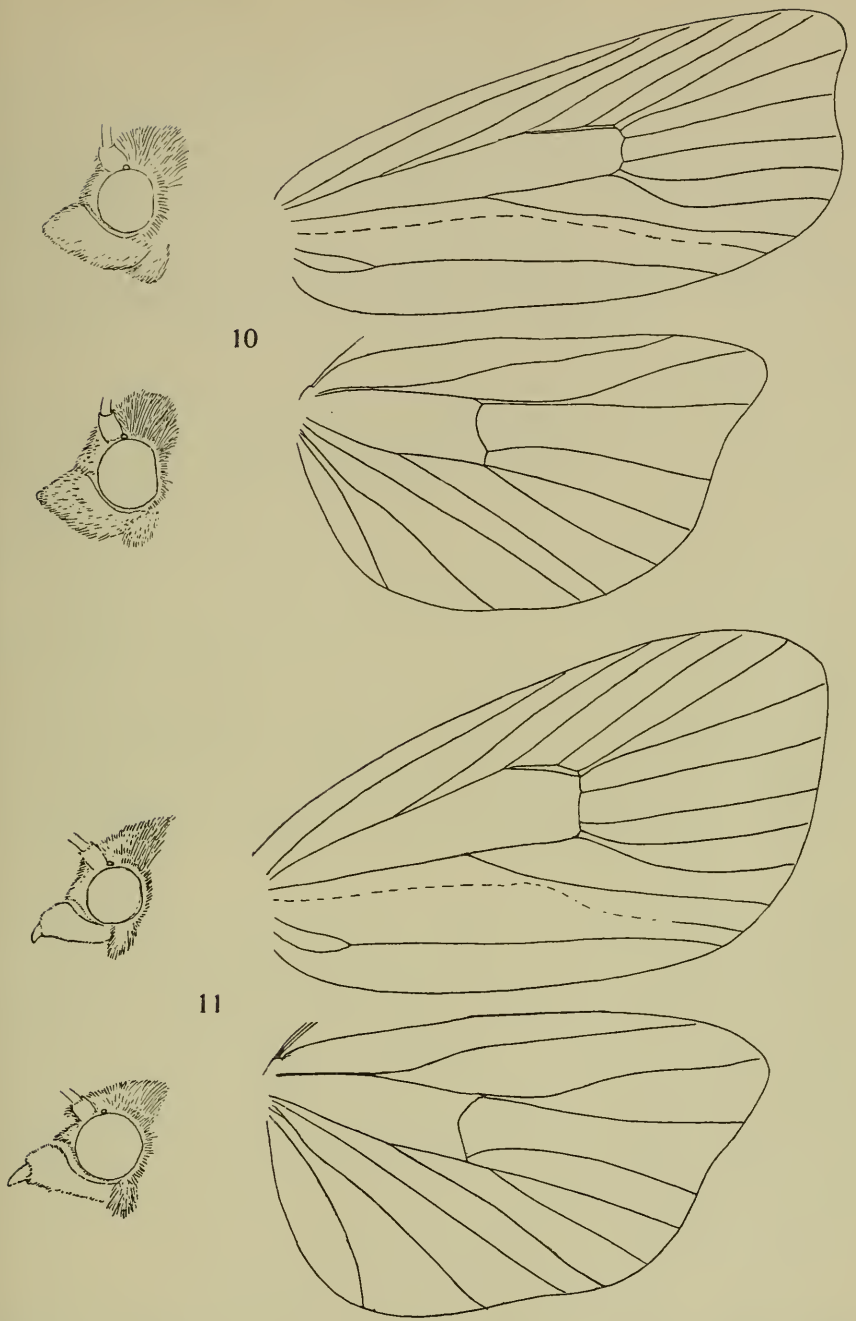


Fig. 10. *Pseudogalleria inimicella* Zeller, head, male above, female below, and wing neuration, male. Fig. 11. *Cryptophlebia* (*C.*) *ombrodelta* (Lower), head, male above, female below, and wing neuration, female.

Fore wing (fig. 11) without raised scales-tufts; 12 veins, all separate. Vein 2 from before $^2/_3$, 3 and 4 separate from angle, 5 not approximated, straight, 4 slightly nearer to 3 than to 5, 7 and 8 rather approximated towards base, 9 from more than $^1/_3$ distance between 8 and 10, 11 from well before middle of cell; parting vein from just beyond base of 10, to about base of 7, accessory cell narrow.

Hind wing normal in female (fig. 11), 2 from $^2/_3$, 3 and 4 short-stalked from angle, 5 curved and rather closely approximated at base, 6 and 7 closely approximated towards base; hind wing in male (fig. 20) usually modified by the development of a more or less extended fold on the upper side along vein 2, usually accompanied by thickenings and modifications of cilia, and sometimes, also by marginal lobes of the dorsum; veins usually reduced consequently, cell shorter than in female, in *ombrodelta* veins 3 and 4 connate, both traceable, but vein 2 concealed in fold.

Male genitalia (figs. 13, 14) very similar to those in *Pseudogalleria*. Tegumen simple, band-like. Uncus absent. Gnathos perhaps indicated by small pointed projections at each side (absent in *Pseudogalleria*). Tegumen simple, band-like. Soccii absent. Vinculum small, but very strong, forming a strong articulation with the sclerotized bases of sacculi. Valva elongate, cucullus blown up, with strong spines on the inner surface, of variable arrangement and size, differing specifically. Aedoeagus slender, long and bent, cornuti, a series of flattened spines. Eighth segment modified, as described above (fig. 12).

Female genitalia (fig. 15) with sterigma variably sclerotized, presenting clear specific differences, especially by the shape of the extensive lamella antevaginalis, and in the shape and size of the crochet-like signa.

Considerable differences of the signa in otherwise closely related species are instructive, and learn that it is not always possible or justifiable to attach more than specific importance to the shape of these sclerites in the Olethreutinae.

The above redescription is made chiefly from two species: *C. ombrodelta* Low., the type of the genus, and from *C. semilunana* Saalm., a very similar, large species from Madagascar.

Owing to the kindness of Mr. IAN F. B. COMMON of the Commonwealth Scientific Research and Industrial Organization, Canberra, Australia, I was able to study some material from that country of a species that probably is conspecific with *Acanthothyspoda elaeodes* Low., while Dr. N. B. TINDALE, of the South Australian Museum, Adelaide, Australia, kindly sent me coloured dias of the holotype of this species. LOWER's description, and MEYRICK's redescription suggest that this insect would also belong to *Cryptophlebia*, but that appears now not to be so. Neither congeneric are *Temnolopha* Lower 1901 nor *Sorolopha* Lower 1901, material of which was kindly put at my disposal by Mr. J. D. BRADLEY, British Museum (Natural History).

The genus falls apart into two distinct subgenera.

Cryptophlebia subgenus nov. (fig. 13)

Valva without a marginal tooth towards the top of the sacculus. Markings distinct in the two sexes, of the *ombrodelta* type, as in figs. 6 and 7, colouring more or less dark brownish-violet or lilac.

Type of the subgenus : *Cryptophlebia ombrodelta* (Lower), ♂, ♀.

Cryptophlebia (Cryptophlebia) ombrodelta (Lower 1898) (figs. 11—15, 20, 22)

Arothrophora (?) *ombrodelta* Lower 1898, Proc. Linn. Soc. N. S. Wales, vol. 23, p. 48 (♂, Victoria). — Diakonoff, 1953, Verh. Kon. Ned. Akad. Wet., Nat., ser. 2, vol. 49, no. 3, p. 157.

Cryptophlebia carpophaga Walsingham 1899, Ind. Mus. Notes, vol. 4, p. 106 (♂ ♀, India). — Barlow, E., 1903, Ind. Mus. Notes, vol. 5, p. 121, pl. 15, fig. 2, 2a, 2b. — Lefroy, 1909, Ind. Insect Life, p. 531, pl. 28, fig. 11, 12. — Diakonoff, 1953, Verh. Kon. Ned. Akad. Wet., Nat., ser. 2, vol. 49, no. 3, p. 157.

Argyroploce illepida Meyrick 1910, non Butler 1882, Proc. Linn. Soc. N. S. Wales, vol. 36, p. 265 (syn. *ombrodelta* Low. and *carpophaga* Wals.). — Ind. Mus. Notes, 1911, vol. 5, p. 218. — Fletcher, 1914, South Ind. Insects, p. 449—450, fig. 327. — 1917, Proc. 2nd Ent. Meeting, p. 230, 234, 257. — 1920, Mem. Agr. Ind., Ent., vol. 4, p. 56—57 (life history, foodplants). — 1932, Imp. Counc. Agr. Res., Sci. Mon. 2, p. 29, pl. 19 (stages, ♀). — R. Ayyar, 1921 Rep. 4th Ent. Meeting, p. 364 (paras.: *Euagathis cryptophlebiae* Viereck.). — Van der Goot, 1940, Landbouw, vol. 16, p. 507—509, 514, figs. 1—7; also as Meded. Alg. Proefst. no. 46 (Med. Inst. Plantenziekten no. 99), 1940, p. 1—13 (life-history, foodplants, parasites, econ. importance, in West Java). — Clarke, 1951, Journ. Washington Acad. Sci., vol. 41, p. 299, fig. 5, 6, 13.

Cryptophlebia ombrodelta, Bradley, 1953, Bull. Entom. Res., vol. 43, p. 682, text fig. 1 (gen. ♂), pl. 24 fig. 1 (♀), pl. 25 fig. 1, 1a (gen. ♀). (Syn. *carpophaga* Wals.). — N. B. Tindale, 1955, Trans. Roy. Soc. S. Austral., vol. 78, p. 97—98, fig. (lectotype ♀ designated).

Distribution (after BRADLEY) South India, Ceylon, Formosa, Java, Siam, Philippine Islands, Guam, Dampier Island, Queensland, New South Wales, Northern Territory of Australia.

Food plants. *Parkinsonia aculeata* (leaves, pods), *Cassia fistula, C. occidentalis* (pods), Bauhinia purpurea (pods), (Caesalpiniac.); *Sesbania aculeata* (pods), *S. grandiflora* (seeds), *Tamarindus indica* (fruits) (Papilionac.); *Acacia arabica, A.* spp., *Adenanthera pavonia, Pithecolobium dulce* (Mimosac.); *Nephelium litchi* (fruits and seeds) (Sapindac.); *Aegle marmelos* (fallen fruits), *Feronia elephantum* (fruits) (Rutac.). Type, ♀, in the South Australian Museum.

The species apparently is of Indian origin. According to MEYRICK (1911, p. 264) it "forms a prominent feature in the Indo-Malayan element (of the Australian Tortricidae) which enters (Australia) by way of Northern Queensland".

This opportunity is used to reproduce the nice but little known figures of VAN DER GOOT (1940), illustrating the stages of the present species (figs. 1—7).

bium lobatum, 25.II.1929, 1 ♂; 18.III.1929, 1 ♂; 19.V.1932, 2 ♂, gen. no. 2144, name label in SNELLEN's hand: "*Grapholitha deformana* m."; the same locality and date, 1 ♀, SNELLEN's label: "*Grapholitha subviolaceana* m." ! Named by MEYRICK: "*Argyroploce illepida* Btl."; the same locality, 1888, 2 ♀. Buitenzorg, 250 m, Institute for Plant Deseases and Pests, bred from pods of *Pithecolobium lobatum*, 25.II.1929, 1 ♂; 18.III.1929, 1 ♂; 19.V.1932, 2 ♂, gen. no. 1110, 9 ♀ (P. VAN DER GOOT); the same locality and food plant, XI.1942, 2 ♂, 3 ♀ (R. AWIBOWO); 20.V.1943, 1 ♂; 8.VI.1943, 1 ♀, without locality or food plant, gen. no. 2152 (R. SOEDIRO).The same locality, at light, 21.IX.1949, 1 ♂, gen. no. 1692; 23.III.1950, 1 ♂; 10.III.1951, 1 ♂, gen. no. 2142; 7.V.1951, 1 ♀ (F. C. DRESCHER). 22.V.1949, 1 ♀ (G. I. IMBERT). Bandung, 740 m, 13.V. 1940, at light, 1 ♂, gen. no. 2151 (J. OLTHOF).

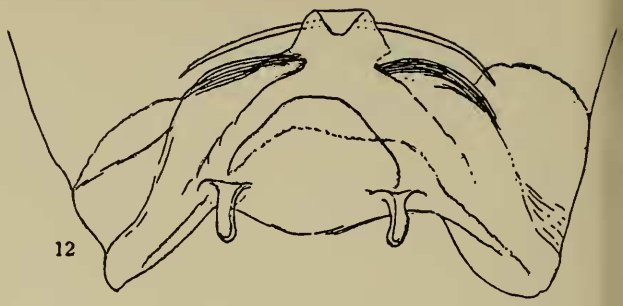
Central Java, Gedangan near Semarang, teak forst, bred from pods of

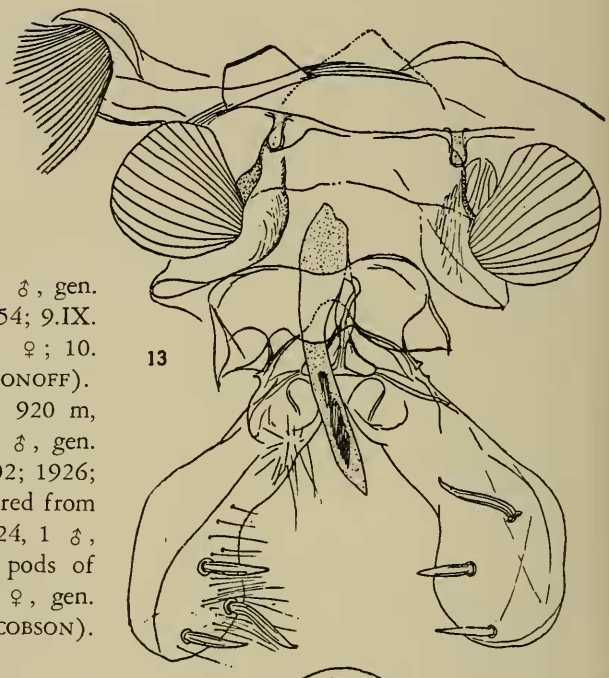
Bauhinia hirsuta, B. malabarica and Caesalpinia sappan, 31.VII.1931, 1 ♂; 5.VIII.1931, 1 ♂, gen. no. 2160; 8.IX—18.IX.1931, 5 ♂, 4 ♀; Seneng, near Semarang, teak forest, the same food plants, 17.IX—12.X.1939, 4 ♂, 2 ♀; 21.VIII.1932, 1 ♀; 30.IX.1931, 1 ♂, gen. no. 2159 (all collected by L. G. E. KALSHOVEN). Ambarawa, 500 m, 1 ♂, gen. no. 2143; 1 ♀ (LUDEKING).

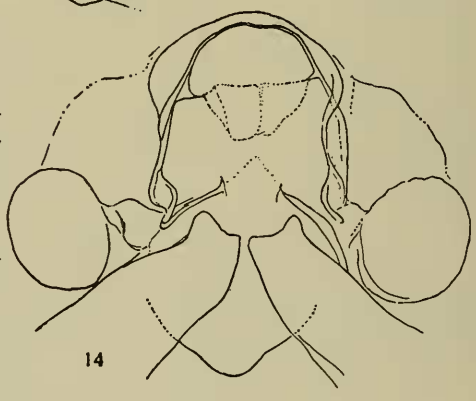
East Java, Pasuruan, 5 m, bred from pods of *Acacia farnesiana,* 5.IX.1939, 1 ♂, gen. no. 1698; 7.IX.1939, 1 ♂, gen. no. 1699; 1 ♀, gen. no. 2154; 9.IX.1939, 1 ♀; 22.VII.1940, 1 ♀; 10.VII.1940, 2 ♂ (A. DIAKONOFF). Sumatra, Fort de Kock, 920 m, III.1921; VI.1922; 1924, 1 ♂, gen. no. 1700, 1 ♀ gen. no. 1702; 1926; 1922, 1 ♂, gen. no. 2147; bred from pods of *Cassia laevigata,* 1924, 1 ♂, gen. no. 2145; bred from pods of *Phaseolus lunatus,* 1924, 1 ♀, gen. no. 2146. 9 ♂, 1 ♀ (E. JACOBSON). 38 ♂, 31 ♀.

Borneo, Banga Radan, 1 ♀ (without abdomen).

Male genitalia (figs. 13, 14). Tegumen (fig. 14) simple, moderately broad, band-shaped, Uncus and socii







Figs. 12—14. Male genitalia of *Cryptophlebia (C.) ombrodelta* (Lower). 12. Eight abdominal segment, dorsal aspect. 13. Genitalia, dorsal aspect. 14. Tegumen, frontal aspect.

absent. Gnathos represented by a small angular projection on each side of tegumen, but it is also possible that these projections are correlated with the membraneous tuba analis, and then rather represent subscaphium. Valva robust, with a sturdy base forming a strong articulation with the equally strong small vinculum; cucullus blown up, almost club-like, on the inner side with three large, slightly sinuate or curved, pointed spines. Caulis long. Aedoeagus long, slender, curved, bulbate at base. Cornuti, a long patch of slightly flattened, rather slender spines. Eighth segment (fig. 12) strongly developed, plicate, forming a pair of spheroid coremata, consisting of ribbon like scent scales. Sclerotized anterior edge of eighth tergite (fig. 12) forming a curved median lip, flanked by two transverse sclerites, and preceded by a narrow bow-like single band; eighth sternite triangular, with a more or less rounded top. Large coremata of the seventh abdominal segment (only one partially figured, fig. 13, left) shaped like expansile pencils (15 slides studied).

Fig. 15. Female genitalia of *Cryptophlebia (C.) ombrodelta* (Lower).

Female genitalia (fig. 15). Sterigma formed by an erect-rectangular or erect-subtrapezoidal plate, rather weak, with a deep median emargination of the caudal edge, in which fits a tulip-shaped body formed by two lateral petal-like sclerites, separated by a median, longitudinal split, sometimes ill-defined. Ductus bursae unarmed. Bursa copulatrix big, aciculate; signa, two aciculate inequal horns with dilated bases, one signum more slender, with a larger plate, another thicker, with a smaller basal plate (Slides studied: nos. 2146, 2154, 1702).

Cryptophlebia (Cryptophlebia) farraginea (Meyrick 1931) combin. nov. (fig. 16)

Argyroploce farraginea Meyrick 1931, Exot. Microl., vol. 4, p. 137 (Java, "Kediri", ♂ ♀). — Clarke, 1955, Catal. Meyrick's types, vol. 1. p. 140.

Distribution: Central Java.

Java : holotype, male, gen. no. 2141, coll. no. 1211, "shoot borer of weroe"

(*Albizzia procera*); label in red ink: "*Argyroploce farraginea* Meyr. 24" (left fore wing missing). In the Leiden Museum. Two more males, (syntypes), with the same rearing nos. 1211 and food plant labels (abdomens missing). The collector, Dr. L. G. E. KALSHOVEN, kindly informed me that this indeed is the original and the only series of the species, bred in the province of Kediri, Central Java.

South Celebes, Mount Lompobatang, Borong Rapoa, 850 m, 19—24.VIII. 1949, at light (A. DIAKONOFF), 1 ♂, gen. no. 2150; with the fore wing almost devoid of markings, pale fuscous-tawny, tinged lilac, sprinkled with dark points which tend to form transverse strigulation; the hind wing also paler than in the type; the genitalia are identical.

The female allotype specimen seems to be lost.

Male genitalia (fig. 16). Tegumen rather depressed. Gnathos absent. Vinculum shaped as a narrow V. Valva rather long, somewhat curved, cucullus little dilated or swollen, with five large spines arranged in a pentagon, two larger (one dorsal subapical, and one ventral apical), and three smaller (one upper apical, lower subapical and lower proximal); sacculus with a straight series and an oval patch of short hairs. Aedoeagus with an abruptly dilabted bottle-shaped base, and a gently dilated, oblique top. Cornuti not numerous, small spindle-shaped spines. Eighth tergite (fig. 17) subtriangular, weak, top with a triangular darker sclerite, eighth sternite with upper half trapezoid, lower half semi-ellipsoid, on each side a small triangular sclerite on a short stalk. (Slide figured: holotype, no. 2141; slide studied: no. 2150).

Phanerophlebia subgenus nov. (fig. 18)

Valva with a robust, rectangularly projecting blunt marginal tooth towards the top of the sacculus. Markings in male ill-defined, a pattern of small strigulae; in female markings distinct; colouring pale tawny, without a trace of violet or lilac.

Type of the subgenus: *Cryptophlebia* (*Phanerophlebia*) *perfracta* spec. nov., ♂, ♀.

Cryptophlebia (Phanerophlebia) perfracta spec. nov. (figs. 18, 23)

♂ 16—18 mm (holotype 18 mm). Head pale ochreous, faintly touched with lilac on vertex. Antenna pale ochreous. Palpus rather long, little dilated, ascending, terminal segment moderate, exposed ,drooping; pale ochreous, finely touched with lilac, tegulae somewhat darker, more distinctly touched with lilac, with a faint golden gloss in certain lights; without a posterior crest. Abdomen whitish-ochreous with a strong golden or brassy gloss. Legs pale tawny-lilac, posterior leg whitish-ochreous, posterior tibia moderately dilated by bristly hair-like scales above and beneath.

Fore wing elongate-subtriangular, broadest at $^5/_6$, costa gently curved, slightly more so at base, apex obtuse, termen straight, oblique; somewhat roughish-scaled, but without raised tufts. Whitish-ochreous, densely irrorated with rough pale fulvous-tawny or pale tawny-lilac scales, and transversely strigulated with pale tawny-lilac, strigulations also mixed with small fuscous scales posteriorly; costa minutely strigulated throughout with fuscous-brownish; an ill-defined darker fulvous mark on $^1/_3$ of dorsum, rising to fold, thence produced along fold

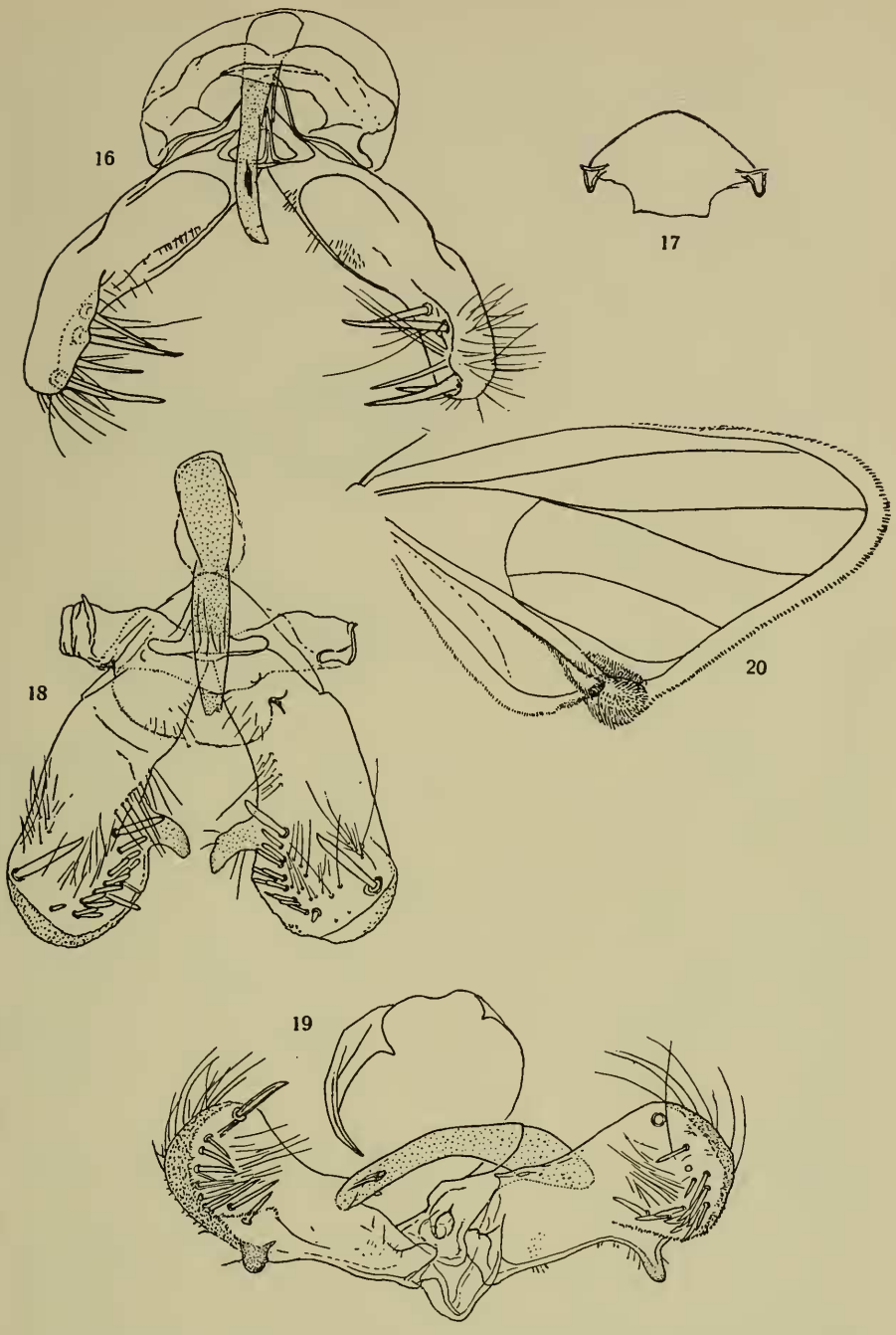


Fig. 16. Male genitalia of *Cryptophlebia* (*C.*) *farraginea* (Meyrick). Fig. 17. The same, eighth abdominal sternite. Fig. 18. Male genitalia of *Cryptophlebia* (*Phanerophlebia*) *perfracta* spec. nov. Fig. 19. The same of *Cryptophlebia* (*P.*) *sumatrana* spec. nov. Fig. 20. Hind wing of *Cryptophlebia* (*C.*) *ombrodelta* (Lower), male.

posterad; an indication of a fulvous fasciate or erect-triangular mark on dorsum before tornus, rising to about base of vein 4. Male paratype somewhat more suffused with fulvous. Cilia (imperfect) fulvous-tawny, becoming pale in tornus.

Hind wing whitish-ochreous, minutely, evenly, and densely irrorated with fuscous, except on dorsum beyond vein 1a which area is hyaline, and along anterior $^3/_4$ of costa. Cilia whitish-ochreous, with a subbasal fuscous shade, basal half with a strong golden gloss in certain lights, apical half appearing whitish then. Cilia along dorsum long and dense, similar cilia also along upper side of vein 1a. Veins 3 and 4 short-stalked, 5 rather approximated.

♀ 20—21 mm (allotype 20 mm). Head, antenna, palpus and thorax of the same colour as in male; palpus somewhat longer and slightly more dilated at apex.

Fore wing narrower, more distinctly dilated, broadest at $^4/_5$. Whitish-ochreous with the faintest pinkish tinge, retinate and partially strigulated with light brown. Markings deep brown, well-defined. An inwards-oblique streak from $^2/_5$ of dorsum to fold, thence to below costa well beyond its middle, top extended into a triangular equilateral spot, with posterior edge vertical, extending beyond discoidal vein; a deep brown semicircular spot on dorsum before tornus, its top connected by a light brown strigula with the lower side of patch in cell; a deep brown fasciate terminal patch, limited above by vein 9, oblique, resting on termen at $^2/_3$, ovately clavate (above more than twice as broad as below); a small dark brown transverse strigula in apex; costa finely and indistinctly strigulated with brown; paler ground colour between discal and terminal patches parted by a light brown oblique stria from $^2/_3$ of costa to posterior side of dorsal patch, followed by another parallel strigula, from middle of anterior edge of terminal patch to tornus. Cilia pale ochreous-fuscous, with a pale base and a darker fuscous antebasal fascia.

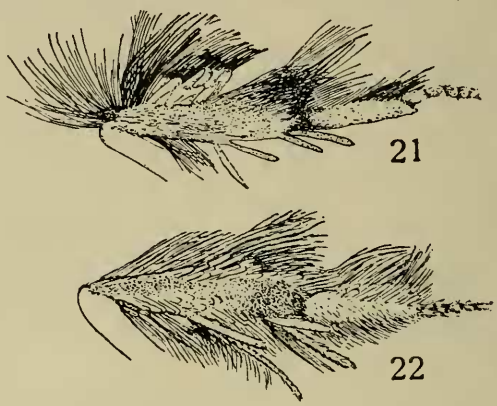


Fig. 21. Posterior tibia and tarsus of the male of *Ecdytolopha punctidiscana* (Dyar) (After C. HEINRICH, 1926). Fig. 22. The same of *Cryptophlebia* (*C.*) *ombrodelta* (Lower).

Hind wing and cilia as in male, dorsum beyond vein 1a paler, thinly haired.

Male genitalia (fig. 20). Tegumen weak and narrow, gnathos obliterated in middle, very thin. Vinculum rather short. Valva with an abruptly dilated cucullus, wrinkled and finely aciculate on the outer side, on the inner side with a submarginal semicircular crown of pointed spines: dorsally a large spine, then much shorter and more slender spines, gradually becoming longer and more robust ventrad; inside this semicircle, a group of hairs. Sacculus little differentiated, with a large, blunt apical tooth. Juxta small. Caulis long and robust. Aedoeagus curved, with a moderately bulbate base. (Slide figured, no 1697, paratype).

Female genitalia (fig. 23). Ninth segment sclerotized, rather high. Lamella antevaginalis, a small, rectangular plate with rounded angles, higher than broad,

slightly dilated above, incision of upper edge reaching to middle. Ostium bursae shaped as a rather large dark-walled funnel, with an additional vertical split in middle. Signa, moderately long, slender, inequal hooks. (Slide figured, no. 1696, allotype).

East Java, Tengger Mountains, Nongkodjadjar, 1300 m, 20.III.1940, at light, 1 ♂, gen. no. 1697; the same, 26.IV.1940, 1 ♂, holotype; the same, 8.III.1940, 1 ♀; the same, 8.V.1940, 1 ♀, allotype, gen. no. 1696 (A. M. R. WEGNER).

West Java, Mount Gedé-Pangerango, Tjibodas, 1400 m, 1 ♀ (A. M. NEERVOORT).

Cryptophlebia (Phanerophlebia) sumatrana spec. nov. (fig. 19).

♂ 29 mm. Head and thorax pale tawny, tegulae somewhat brighter tawny. Palpus pale tawny, irrorated with slightly brighter brownish. Antenna with flagellum brownish. Abdomen tawny, irrorated with brownish and fuscous, except towards base on venter, dorsum with pale tawny long hairs, anal tuft large, pale tawny. Legs light tawny, tibiae dilated with roughly appressed scales, posterior leg pale tawny.

Fore wing elongate, moderately broad, without raised scale-tufts, costa gently curved throughout, more so towards apex, apex rounded, termen hardly concave, almost straight, oblique, dorsum considerably sinuate. Pale tawny, moderately irrorated with brigther tawny-brown. An ill-defined circular suffusion on posterior portion of cell, open below, anteriorly narrowly connected with an inwardly oblique, wedge-shaped, curved patch from $^1/_3$ of dorsum reaching to fold; a moderately

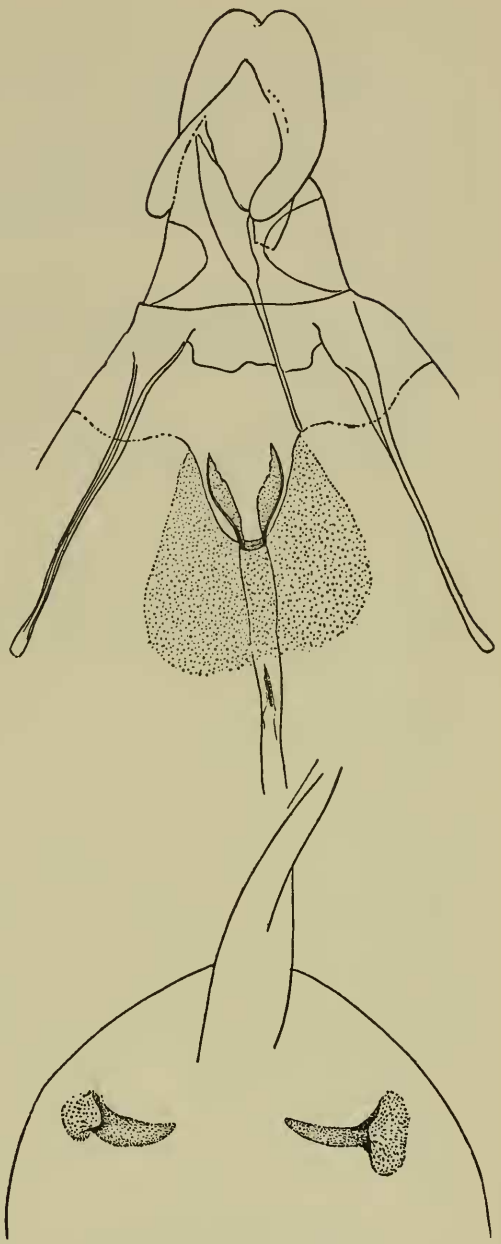


Fig. 23. Female genitalia of *Cryptophlebia* (*Phanerophlebia*) *perfracta* spec. nov.

outwards-oblique, curved transverse fascia from beyond $^2/_3$ of costa, running towards tornus, but hardly reaching edges of wing; this fascia gradually dilated towards extremities and formed of three parallel brown lines, and filled out with brighter tawny; a fourth similar line, more curved, but vertical, beyond the end of cell; some four less defined brownish lines running obliquely before apex, ultimate apical; the entire wing beyond these markings finely transversely irrorated and strigulated with tawny and brownish, this irroration forming rather regular fine strigulation along costa. Cilia rather bright tawny-brown, scales tipped with pale tawny; an antemedian uninterrupted bright tawny-brown line; base of cilia pale tawny.

Hind wing normal, but with dorsum on upper side as far as vein 1a densely covered with long pale hairs; wing tawny-fuscous, rather thinly scaled; veins touched with brown. Cilia pale tawny with a faint golden gloss, a fuscous subbasal line.

Male genitalia (fig. 19) similar to those of *perfracta* spec. nov., but with the tooth of the sacculus longer, more curved and robust, and with the smaller spines of the disc of valva shorter than in *perfracta* and blunt. (Slide figured no. 2149, holotype).

Sumatra, Padang Highlands, Fort de Kock, 920 m, January, 1922 (E. JACOBSON), 1 ♂, holotype, gen. no. 2149.

Very near to the preceding species, superficially differing only by slightly narrower fore wings with a more oblique termen, by slightly brighter markings and a trifle darker hind wings; the male genitalia, however, are distinctly different.